TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE
HUGH S. CUMMING, Surgeon General

CANYON AUTOMOBILE CAMP YELLOWSTONE NATIONAL PARK

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BY

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CANYON AUTOMOBILE CAMP, YELLOWSTONE NATIONAL PARK[1]

By Isador W. Mendelsohn, Associate Sanitary Engineer, United States Public Health Service

The progress of the automobile industry and its influence upon public health—as a factor in the spread of communicable diseases—constitute new problems of increasing magnitude which are now receiving the attention of health officials. Persons who a few years ago remained at home now travel by automobile to Florida, Maine, California, and other States for pleasure and for business. A reliable indicator of such travel is the number of visitors at the national parks, especially Yellowstone. In 1924 there were 144,158 visitors in Yellowstone National Park, of whom 100,186 came in 30,689 automobiles. In 1923 there were 138,352 visitors, of whom 91,224 came in 27,359 cars. These visitors represented every State, as well as Alaska, the Philippines, Hawaii, the Canal Zone, and 23 foreign countries. An estimate places the number of motorists camping out in public grounds in the park at 85,000. When one considers that the park season is limited to the period between June 20 and September 20, these figures show the large congregation of people in a short period.

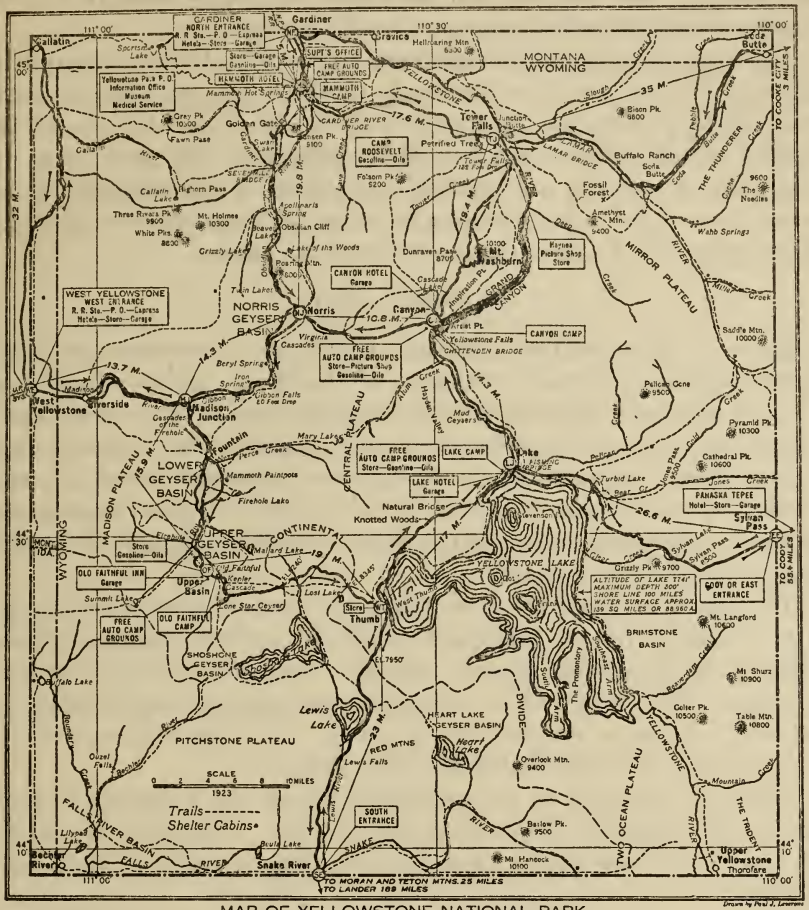
Realizing the attendant public health problems introduced by the mingling, in these parks, of so many people from all parts of the country and even the world, the National Park Service obtained the cooperation of the United States Public Health Service in looking after the sanitation of the parks and assisting with medical service. Sanitary Engineer H. B. Hommon, of the Public Health Service, was placed in charge of such work in 1921, with headquarters at San Francisco, Calif., and with two sanitary engineers as assistants.

A part of the policy of Superintendent Albright, of Yellowstone National Park, is the establishment of public automobile camps at various scenic and central points in the park. These camps are to be provided with all necessary sanitary conveniences for the comfort and health of the automobile campers. Experience has shown the advisability of having many small camps, large camps with 800 or more people being unsuited to conditions in Yellowstone. In accord-

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ance with this policy, automobile camps have already been established at the principal points of interest, such as Mammoth Hot Springs, Old Faithful Geyser, Yellowstone Lake, and the Canyon of the Yel-



MAP OF YELLOWSTONE NATIONAL PARK

Norris ○ Denotes Ranger Station ←—— Direction of Travel

Distances given are between main points by road

lowstone. The Canyon automobile camp is the newest, having been begun in the 1923 season and completed in the 1924 season.

SITE OF THE CANYON AUTOMOBILE CAMP

The Canyon camp covers a plot of ground about 30 acres in extent, along the main road from Yellowstone Lake to Tower Falls, near the point where a branch road turns off to Norris Junction, as shown on the map.

The ground is level for but a small area, the remainder having a slope, pronounced in parts. The drainage is good, the run-off being toward several creeks. Most of the area used at the present time is

wooded, with the trees sufficiently separated to furnish a suitable camping site for an automobile party. The lay of the camp is in a northerly and southerly direction, with plenty of sunshine, shade, and breeze. The top soil is a sand and clay, with some rocks. In places a rock formation crops out on the surface.

The camp is accessible to the main highway by two short stretches of road. There are two dirt roads in the camp, varying in width from 10 to 20 feet, as the location of the trees and the lay of the ground permit—one of the important policies of the park being not to destroy a tree nor mar natural conditions in any manner. Some conception of the camp site may be obtained from the accompanying photograph (Pl. I), showing a section of the camp.

WATER SUPPLY

Water is obtained from Cascade Creek, at a concrete dam about three-quarters of a mile northwest of the camp, and one-quarter of a mile east of the Canyon-Norris Junction Road. This creek passes through stretches of wooded and open land off the beaten tourist path. Only a small number of people on horseback cross this land during the park season, and then under the supervision of experienced guides. The creek water comes from mountain springs; it is clear and soft and is not treated.

The water is forced by three hydraulic rams, having a daily capacity of about 70,000 gallons, through two 3-inch galvanized iron pipes to a two-compartment concrete reservoir of 27,000 gallons capacity. The reservoir is on land about 160 feet higher than the intake, and has a wooden board cover. A 4-inch galvanized iron pipe extends from the reservoir to the camp.

Water is furnished to the comfort stations and hydrants in camp and to the ranger station and stores near by. About 10,000 gallons of water a day are used to sprinkle the roads in order to keep down the dust.

There are 38 water hydrants in the camp, spaced about 200 feet apart and equipped with bronze self-closing cocks. The water lines are of ¾-inch galvanized-iron pipe, extending 36 inches above the ground, and are fastened to posts or trees by galvanized-iron pipe straps, one to each hydrant. Two 2-inch No. 10 flat headed, brass, wood-screws are used on the straps. A hole has been dug in the ground beneath each spigot and filled with gravel to permit the filtration of waste water into the ground.

SEWERAGE SYSTEM

The camp has four comfort stations provided with flush toilets and washbasins. The wastes are led by an 8-inch tile sewer to a covered concrete septic tank below the ranger station, where the

effluent is chlorinated in a special section of the tank designed for a contact period of 30 minutes. The sludge will be removed at the end of each season onto a drying bed located adjacent to the tank. The chlorinated effluent is discharged into a creek leading to Yellowstone River. The disposal plant was completed at the end of the 1924 season, and is so located as not to cause a nuisance. It is practically hidden among the trees, all natural facilities being utilized to screen it from the passers-by on the road. The plant will be operated by the sanitary engineer of the United States Public Health Service detailed to Yellowstone National Park, under the supervision of Sanitary Engineer Hommon.

The 4 comfort stations have 16 flush closets and 4 washbasins for women, and 15 flush closets, 4 urinals, and 4 washbasins for men. At the present time one of the men's flush closet compartments is used for storage of the caretaker's materials, but generally the space between the men's and women's sections is used as a storage place. The comfort stations are cleaned daily by a caretaker, paper being removed, the floors washed down, and a deodorant placed in the flush bowls and the urinals. Toilet paper is provided in these buildings, but no soap.

The comfort stations are so located as to be readily available to the automobile tourists. They are of a pleasing rustic design, harmonizing well with their surroundings. They were designed by the landscape engineer of the National Park Service. A layout of one of these stations is shown in Figure 1. Following is a complete list of materials and plumbing equipment.

List of material for one comfort station

LOG LIST

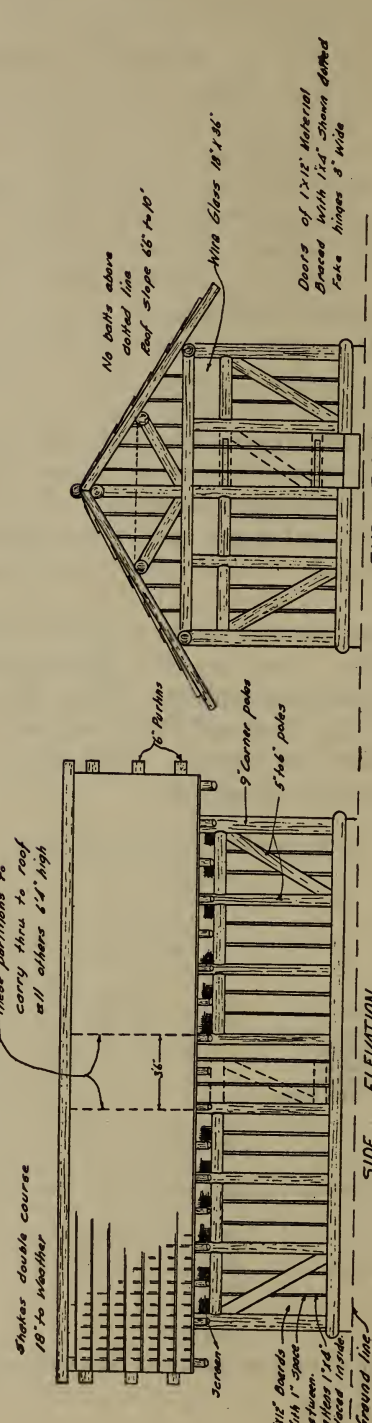
Number	Size	Length	Linear feet	Use	Number	Size	Length	Linear feet	Use
	Inches	*Ft. In.*				*Inches*	*Ft. In.*		
18	6	7 0	126	Sides.	2	6	4 0	8	Ridgepole support.
18	6	2 11	54	Cross braces.	4	9	7 0	28	Corner logs.
34	5–6	11 6	391	Rafters.	2	7	23 9	48	Half logs.
5	6	28 6	143	Purlins.	2	7	13 8	28	Do.
2	6	12 10	26	Headers.	8	5	14 0	112	Cross braces.
12	6	5 0	60	Corbel braces.					

LUMBER

Pieces	Size	Description	F. B. M.	Pieces	Size	Description	F. B. M.
23	2″ x 4″ x 12′	C. R	184	3	1″ x 6″ x 12′	S. 1S	18
96	1″ x 12″ x 16′	S. 1S	1,536		1″ x 8″	Shiplap	900
50	1″ x 4″ x 12′	S. 1S, 2E	200	8	2″ x 6″ x 10′	C. R	80
13	2″ x 4″ x 12′	S. 4S	104				

CEMENT

35 sacks of cement, 1–5 bank run gravel, with 1 sack of cement for floating


Shakes double course 18" to weather
These partitions to carry thru to roof all others 6'4" high
6' Partns
9' Corner poles
5'6x6' poles
Screen
1"x12" Boards with 1" space between. Battens 1"x4" placed inside
Ground line
SIDE ELEVATION
No battens above dotted line
Roof slope 45° to 10'
Wire Glass 18"x36"
Doors of 1"x12" Material Braced with 1"x4" Shown dotted
Poke hinges 3' wide
END ELEVATION

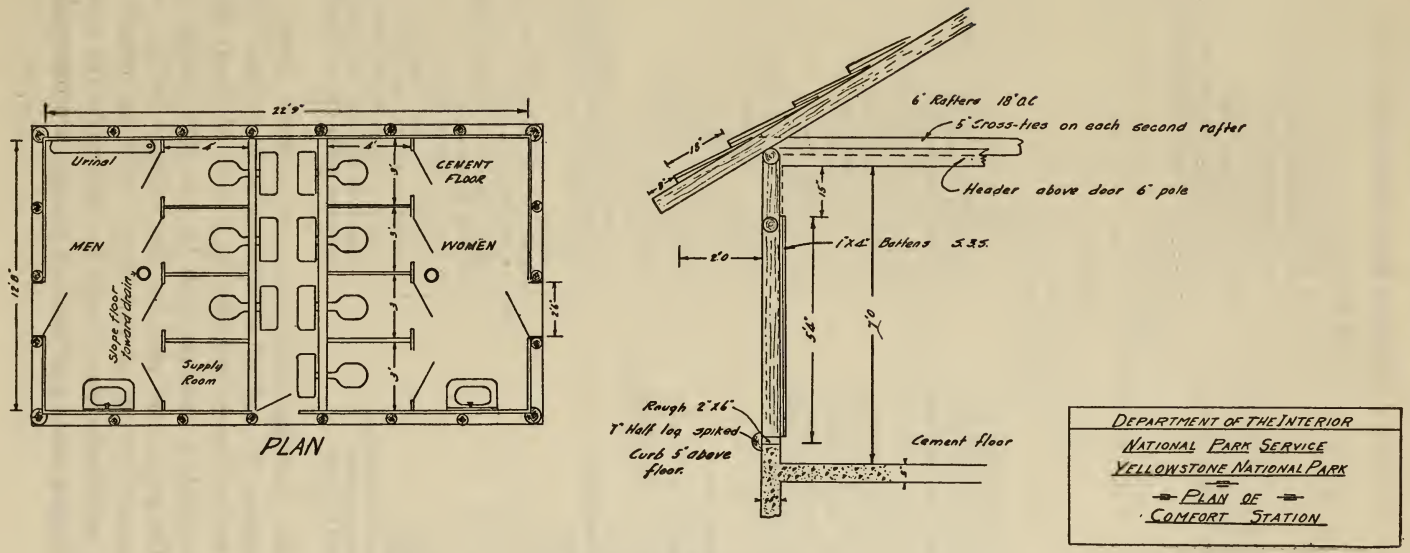


FIG. 1.—Layout of comfort station

List of material for one comfort station—Continued

HARDWARE

2 rim locks.
3 padlocks.
3 hasps and staples.
8 pairs spring hinges, adjustable tension.
3 pairs 6-inch strap hinges.
2 pairs fake hinges, ¼ by 2 by 27 inches.
2 boxes No. 7 screws.
25 pounds nails, 6d.
10 pounds finishing nails, 6d.
10 pounds nails, 10d.
10 pounds spikes, 60d.
25 pounds spikes, 100d.
30 ⅝ by 13-inch round iron drift pins.
25 pounds 5d. galvanized nails for shakes.

MILLWORK

8 doors, 4-panel—24 by 60 inches—1-inch material

SHAKES

57 bundles (30 shakes to each bundle)

PLUMBING MATERIAL

40 feet 4-inch d. h. extra heavy soil pipe.
20 feet 2-inch d. h. extra heavy soil pipe.
20 feet 4-inch s. h. extra heavy soil pipe.
10 feet 2-inch s. h. extra heavy soil pipe.
2 4-inch c. i. floor drains, with spigot ends, to calk into extra heavy soil pipe.
4 4-inch extra heavy double Y branches.
4 4-inch extra heavy single Y branches.
1 4-inch by 2-inch extra heavy Y branch.
3 4-inch extra heavy one-eighth bends.
6 4-inch extra heavy one-sixteenth bends.
3 4-inch extra heavy one-fourth bends with 2-inch high heel inlet, extra heavy.
1 4-inch clean out.
1 4 by 4 inch extra heavy offset.
1 4-inch roof-flashing lead.
1 2-inch roof-flashing lead.
10 2-inch extra heavy one-eighth bends.
1 4-inch extra heavy 4 by 1½ inch tapped cross.
8 4-inch calking ferrules.
9 feet 4-inch 6-pound lead soil pipe.
20 pounds wiping solder.
170 pounds calking lead.
25 pounds oakum (rope).
8 brass closet flanges.
8 asbestos graphited rings.
16 closet-floor bolts.
16 closet screws.
16 N. P. oval washers.
16 N. P. round washers.
2 pounds tinner's solder.
30 feet 1½-inch galvanized iron pipe.
2 1½-inch galvanized iron elbows.
2 1½ by 1½ by 1¼ inch G. I. tees.
1 1½-inch G. I. tee.
1 2 by 1½ inch G. I. reducing coupling.
3 1½-inch ring hangers.
24 1 by 12 wood screws.
10 ⅜-inch compression stops.
2 ⅜-inch basin cocks.
2 N. P. cock-hole covers.
2 1¼-inch basin plugs.
1 1¼-inch slip nut.
1 1½-inch slip nut.
2 ½-inch hose bibbs.
2 2 by 2 by ½ inch G. I. tees.
14 ½-inch G. I. elbows.
4 ½-inch G. I. tees.
4 ½-inch G. I. plugs.
20 ½-inch G. I. nipples.
6 ½-inch G. I. 45° elbows.
3 ½-inch gate valves.
1 1½-inch gate valve.
24 1-foot 10-inch r. h. wood screws.
8 reverse-trap siphon-action closet bowls.
8 standard white enamel concealed low-down closet tanks.
8 closet seats, whale-bonite, open front.
8 feet ⅜-inch G. I. pipe.
2 ¼ by ⅜ inch G. I. reducing couplings.
4 ⅜-inch G. I. nipples.
8 ½ by ⅜ inch G. I. elbows.
1 1½-inch N. P. "O" trap, with c. o. screw.
2 1¼-inch N. P. "O" trap, with c. o. screw.
1 60-inch white enamel urinal, rolled rim, with brass wash-down pipe and beehive strainer.
2 white enamel 20 by 16 inch washbasins.

Although the drawing shows but seven flush closets, and one locker for storage, the list of equipment is for eight flush closets. The comfort stations were installed at a cost of about $900 apiece. This price was made somewhat high by the high freight charges on materials to the park, and also by the drayage in the park to the camp. A comfort station of this type could be installed at considerably less cost near cities, where the materials are readily available and the freight rates and hauling charges are reasonable.

GARBAGE AND REFUSE DISPOSAL

For the disposal of garbage and refuse from the campers, small, shallow pits were dug throughout the camp at sufficiently frequent intervals to be convenient to the tourists. These pits are cleaned out daily by the camp cleaner, who hauls the garbage and refuse in a horse-drawn cart to a plot of ground about 1 mile from the camp. At this place the wastes are dumped into a pit and covered with earth. Ashes from campfires are collected and disposed of in the same manner.

MOSQUITO-CONTROL MEASURES

Owing to heavy snows and depressions in the ground about the camp, the mosquito infestation was heavy. The mosquitoes prevailing, however, were not of the malaria-carrier type. At the beginning of the 1924 season, oiling was resorted to, because of the short time available and the lack of funds and personnel. Crankcase oil was sprayed over the pools at weekly intervals on three occasions. The work was concentrated on an area within a quarter of a mile of the camp. Toward the end of the season, when funds were available, the depressions were drained. In the future, pools will be drained wherever possible at the beginning of each season, or oiled, until the land within a half mile of the camp is free from mosquitoes. As additional funds become available, farm drain tile will be used as a means of removing breeding places for mosquitoes.

RECREATION, STORE, AND OTHER FACILITIES

On the main road about 200 feet from the camp is a log ranger station and community house combined in one building. The community house side of the building is large and commodious and is furnished with a fireplace, toilets, and wash rooms. Mail for campers may be left at the ranger station, but a mail box is provided in the camp. There is a daily mail service throughout the park season. General information regarding the park is furnished at the station.

Within a few hundred yards of the ranger station are a general merchandise and grocery store, a photograph supply store, a gasoline filling station, and an automobile supply store. A small fruit and grocery store is located at one corner of the camp.

Good fishing streams are within one-quarter of a mile of the camp. The Grand Canyon of the Yellowstone River is within the same distance. The Canyon Hotel and the Canyon Permanent Camp are about one-half mile from the automobile camp. These provide additional entertainment and comforts. Horses are available at these places for interesting scenic rides in the vicinity.

For the convenience of the campers, 30 wooden tables and benches are provided. The tables are 9 feet long by 30 inches wide by 30 inches high, with benches 10 inches wide on each side, fastened to the table. The bill of material for a table with benches is as follows:

45 linear feet 2 by 10 inch planks, surfaced one side.
24 linear feet 2 by 6 inch planks, surfaced one side.
12 linear feet 4-inch log.
6 6-inch logs 6 feet long.
3 pounds 16-penny nails.
1 pint boiled linseed oil for table coating.

Logs 6 inches in diameter set 3 feet in the ground are used for table legs. The 4-inch logs are fastened to the end logs under the ground to prevent the uprooting of the tables by the campers. This type of table is illustrated in the accompanying photograph.

Wood for camp fires is supplied by the Government from fallen trees or from waste boxes from the hotel and the permanent camp. It is cut to convenient lengths and placed in several piles about the camp.

Everywhere throughout the camp signs have been placed to bring important facilities and regulations to the attention of the tourist. These are of wood or metal, painted white, with green letters, and are attached to trees or posts. The signs read as follows: "Dump Refuse Here;" "Water;" "Clean Your Camp;" "Carefully Extinguish Your Camp Fire." At the reservoir is the following sign:

DRINKING WATER
HELP KEEP IT
PURE
FOR OTHERS

There are other signs, such as those directing to toilets and those giving directions to various places in the park. Also the most important regulations are posted.

POLICING OF THE CAMP

The camp is policed by the park rangers. Every day toward evening one of the rangers from the near-by station visits the camp to see that the camp fires are cared for so as to prevent forest fires, to note the cleanliness of the camp, to instruct the campers regarding camp clean-up before departure, and to count the number of cars in the camp.



A section of the camp



A comfort station



One of the wooden tables with benches

In addition to the foregoing, each car is checked upon entering and leaving the park at the four exits. Upon entrance, a permit is issued, the charge for which is $7.50 per car. The permit is as follows:

No. 20758

DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE

YELLOWSTONE NATIONAL PARK AUTOMOBILE PERMIT

(Issuing station) (Date)

(State) (License No.) (Make)

Fee paid by and permit issued to: (Name of owner or of driver)

Address

(Number of passengers) (Number of firearms)

(Number of dogs) (Breed)

NOTE.—This permit is issued and accepted subject to the regulations governing the park, and entitles the permittee to right of passage over any or all of the roads open to traffic within the park. It is void after December 31 of the year of issue, is not transferable, and if lost can not be duplicated. It must be conveniently kept and must be exhibited to park rangers on demand. Any erasure makes this permit void.

This permit system affords a close check on the automobiles and has time and again resulted in the apprehension and punishment of some motorist who has committed a misdemeanor in the park.

The camp was opened on July 26, 1924, and closed on September 15. The number of automobiles in the camp daily is given in the following table:

Number of automobiles daily in Canyon automobile camp, 1924

Date	Number	Date	Number	Date	Number	Date	Number
July 26	125	Aug. 8	158	Aug. 21	99	Sept. 3	50
27	130	9	149	22	86	4	45
28	123	10	99	23	82	5	23
29	143	11	123	24	71	6	32
30	160	12	153	25	56	7	39
31	120	13	161	26	60	8	18
Aug. 1	110	14	120	27	50	9	26
2	115	15	115	28	55	10	20
3	88	16	130	29	50	11	23
4	135	17	122	30	65	12	17
5	142	18	90	31	60	13	16
6	148	19	98	Sept. 1	52	14	15
7	149	20	115	2	54	15	10

The table shows a total of 4,495 cars on 52 days, or a daily average of over 86 automobiles. The number of cars actually staying at the camp is greater, owing to the arrival of cars at night, after the count. Records in Yellowstone show that each car contains on the average 3.32 people. This would indicate a total attendance of 14,923 people for the above period, or a daily average of 287 people.

SUMMARY

In order to take care of the many automobile tourists in Yellowstone National Park, camps with many comforts and sanitary conveniences are being laid out as rapidly as funds are made available. The Canyon Automobile Camp, the latest to be opened, was completed at the end of the 1924 park season. The water supply, sewerage system, garbage and refuse disposal, mosquito-control measures, stores, service facilities, policing, and management of this camp are described in this paper. Of particular interest are the rustic type of comfort station and the tables and benches installed in the camp.

Acknowledgments.—The writer wishes to acknowledge his appreciation to Superintendent Albright and Master Plumber Wiggins, of Yellowstone National Park, for their assistance in furnishing data for this paper.

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